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CERTIFICATION

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This is to certify that the attached English language document, identified as Invention Patent Gr.5. --- C1. 3. N° 648.021 Device for the Fabrication of the Friction Body for Brakes and Couplings, is a true and accurate translation of the original French language document to the best of our knowledge and belief.

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Device for the Fabrication of the Friction Body for Brakes and Couplings.

Company called: KIRCHBACH'SCHE WERKE KIRCHBACH & Co. residing in Germany.

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The present invention relates to the fabrication of a friction body for brakes and couplings, and in particular, annular discs for disc couplings. It is common knowledge to fabricate annular discs by introducing under pressure into the stampings of a steel plate annular disc, the friction material consisting of a fibrous complex with a binding agent which hardens later, when this material is in a state where it can still be molded. The object of the invention is a device which enables the introduction of the friction material by pressure to the two faces of the disc, as well as the facing of these discs, with the necessary security and precision, while the process is amenable to mass production.

A method of execution of the present invention has been presented by way of example in the attached drawing in which:

Figure 1 is a perspective view of the device assembly enabling the action of pressure.

Figure 2 also shows in perspective the various disassembled parts of the device (exploded view).

Figures 3a and 3b show in a more schematic manner the device in a vertical axial section, in the positions of the two different working phases.

The drawing refers to a method of execution of the device which is designed for the introduction by pressure of the friction material in the form of a round body in an annular friction disc designed for a disc coupling. For the entire installation, essentially only the molding device itself has been represented with its matrices and the mechanisms immediately adapted to it. The press itself, which can be an ordinary eccentric press, has been left out, because it has no importance in the description of the invention.

The device for molding under pressure consists essentially of six parts: the support a of the lower counter-punch, this support resting on the press table; the lower part b of the matrix; the upper part c of the matrix; the interlocking device d, which enables the tightening against one another of the lower and upper part so as to form the assembly which will be later referred to as «the matrix »; finally, the lever system f which guides the matrix.

In the middle of the support base plate is affixed the lower counter-punch 2. Around this counter-punch are assembled four springs 3, which raise the matrix b, c. The lower part of the matrix

constitutes a solid annular body, which has on the bottom a recess with a shoulder 4. On the top of the annular body are affixed two segments 7, 8, which create between them a cavity 5, which crosses the matrix, and whose contour corresponds exactly to that of a corresponding section of the annular plate disc which receives the friction facing. A fragment of the annular disc plate has been represented in figure 1 and is designated by 20. The center of the lower part b of the matrix has a perforation 8 which passes right through it.

The upper part c of the matrix consists of a solid disc which has, at two diametrically opposed locations, radial handles 9, 9. Peripheral notches 10-10 are staggered in relation to these handles. In addition, on the top of the disc are located in diametrical opposition cams 11-11 in the shape of wedges. The disc c is also perforated at its center, and its perforation 6a has the same diameter as the perforation 6 in the lower part b.

The two parts b and c of the matrix can be solidly joined together by an interlocking device d (fig. 2). This interlocking device consists of a circle 12 with two lateral handles 13-13. This circle has a protrusion directed inward which is supported by the shoulder 4 of the lower part b of the matrix. It also possesses two posts 14 directed upward, whose top extremities are bent inward in the form of hooks. The posts 14 pass through the notches 10 of the lower part c of the matrix, while the hooks 15 on these posts 14 are raised on the slope of the cams 11 when the interlocking device is turned in relation to the upper part c of the matrix. Thus, the two parts of the matrix are firmly tightened against one another.

The lower part b of the matrix has two diametrically opposed lateral spindles 15 on which the arms 17 of an articulated system designated generally by f can act. The system possesses at 18 a fixed swivel pin, and its free extremity is connected by a brace 19 to a part of the press that can be raised or lowered. The dimensions of the system of levers are selected so that the range of travel of the matrix guided by the levers when the press is working, is equal to one half of the travel of the upper die e, the active part 21 of which is adapted to the interior of the perforation 6a of the upper part c of the matrix.

The device functions as follows:

Once the upper part c of the matrix is disassembled, after unlocking the locking mechanism, one introduces into the lower part of the matrix (fig. 3a), which kept in the lifted position at a height limited by fixed abutments, by means of the springs 3, the plastic friction material, which is comprised, for example of a mixture of asbestos fibers with a solution of alcoholic bakelite, the desiccation of this mixture having been initiated. Once the depression 6 delimited above by the counter-punch 2 has been completely filled by the mass, the steel plate annular disc 20 is placed in the cavity 5. In order for the disc stamping, which must be coated by the friction body, to coincide with the perforation 6, projections which correspond with the cavity notches have been machined, similar to a gear tooth. The disc stampings are, as can be seen in figures 3a and 3b, slightly smaller than the compression chambers 6, 6a of the matrix. Once the annular disc 20 has been placed, the upper part c of the matrix is placed on the lower part, and they are locked together. The compression chamber 6a of the upper matrix is then also filled with friction material, up to a level which can, for example, be indicated by a marking, and which corresponds to the filling height of the lower chamber. The press is then activated. The active part 21 of the upper punch c descends into the perforation 6a and

compresses the mass which is in this perforation. At the same time, the matrix b, c is displaced towards the bottom by means of the system of levers f, at a rate which is equal to half that of the punch. The result is the production of a perfectly uniforms compression

of the masses above as well as below the disc plate 20, without the disc itself being subjected to a compressive force in one direction or the other. This is important, in particular since the pressure exerted is very high, such that a force exerted on one side would inevitably result in the curvature of the disc plate on the other side. The friction mass, as can be seen in figure 3b, is strongly compressed, in practice up to about 1/8 or 1/10 of his original volume. At the same time, it receives its definitive form, so that it is superfluous to subject it to any subsequent working. When the punch e reverses, the matrix is lifted by the springs 3. After uncoupling of the two parts b and c of the matrix, the top part c of the matrix can be removed and the annular disc 20 can be shifted by a notch, to fill the friction material of the next stamping.

Needless to say, the present invention is not limited to the introduction by pressure of friction material into the stampings of clutch facings of the type represented in the drawing. It can be employed in any situation where the application of friction facing to friction discs or devices of the same kind is involved, by applying this facing to the two faces. The body of the facings need not be of the round form which was presented in the case above. They can also have the form of segments limited by radial lines or by any other straight lines. In the same way, the bodies of the facings can be arranged right beside one another in the peripheral direction. Finally, the compression device can be transformed while maintaining the principal of the present invention, by equipping the annular discs of the same kind, over their entire peripheries with a continuous facing of a single piece, introduced via the two faces.

SUMMARY:

1. Device for the introduction by compression onto the two faces of a friction facing of disc couplings, etc., or for the facing by compression of these discs, characterized by a matrix in two parts which includes between the parts the disc to be coated, in combination with two punches working within two compression chambers which are arranged in the two parts of the material and which receive the facing material, with these punches making, in the process of compression, equivalent relative movements with respect to the matrix.

2. Various modes of execution of this device in which:

a. When the lower punch is fixed, the matrix, during the process of compression, automatically lowers by an amount which corresponds to half of the travel of the upper punch.

b. The descending movement of the matrix, which rests on springs, is produced by the action of a lever in the form of a stirrup whose arms grasp the matrix at their middles, while their free extremities are connected to the mechanism for activating the upper punch.

c. An interlocking of the two parts of the matrix acting in the manner of a bayonet socket.

d. The matrix presents a transverse cavity on its upper face, with this cavity having a contour which corresponds to that of a section of the annular disc, which is to receive the friction facings.

Corporation named:

KIRCHBACH'SCHE WERKE KIRCHBACH & CO.

By proxy:
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